



The Reintroduction of AIRS at the Met Office

James Cameron

Steve English

AIRS Science Team Meeting – 9 March 2006

2) Summary



- Assimilation of AIRS central field-of-view (U1) observations came out of operations on the 13th December 2005, with the introduction of Parallel Suite 9 (PS9).
- Parallel Suite 10 (PS10) includes the use of AIRS warmest field-of-view observations and should become operational on 14th March.
- It is essentially the same assimilation system except for the change of data set, a new set of biases and the exclusion of channels 2107, 2108 and 2109.

3) Outline of talk



- Reminder about the PS9 problems
- Results from AIRS trials
- Future work

4) Problems in PS9



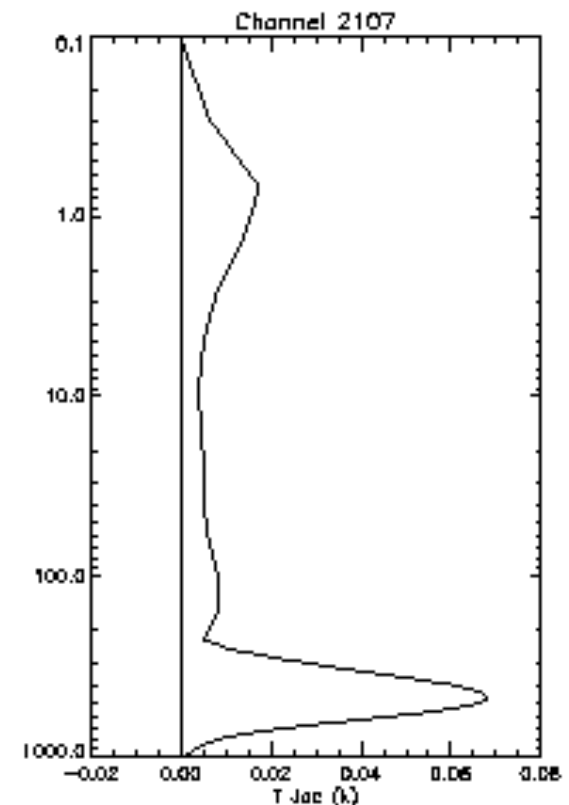
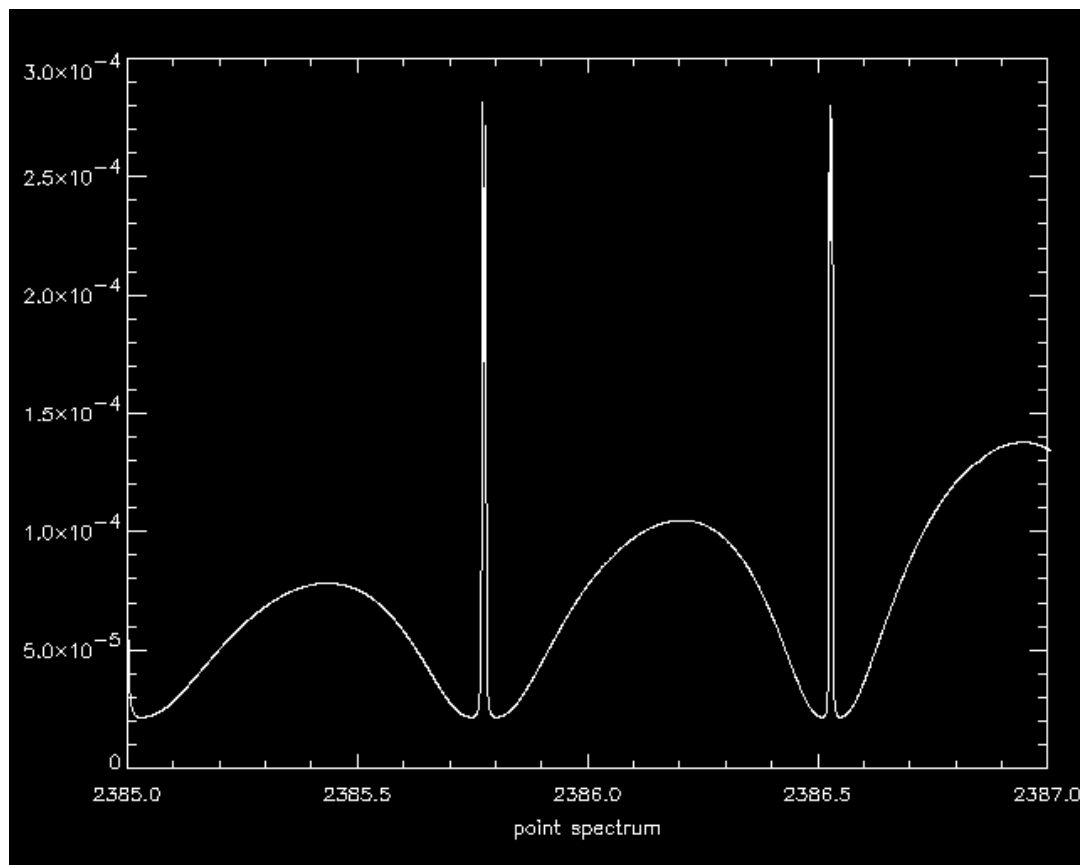
- When running with 50 model level, instead of 38, the assimilation of AIRS data was causing serious degradations.
- The problem was traced to a bug in the data assimilation code.
- An AIRS test, using bug-fixed code and dropping channels 2107, 2108 and 2109 still left some doubts over the performance of the AIRS system.
- It was decided not to risk PS9 by including AIRS.

5) Double Peaked AIRS Channels



Channel 2107 at 2386cm^{-1} (4.19 microns), FWHM 1.880cm^{-1}

The sharp, strong absorption lines cause a double peak in the Jacobian.



6) AIRS Trials



- Both AIRS and AIRSWF tested for the period 11th December 2005 to 11th January 2006.

NWP Index

Trial	vs Analysis	vs Obs
AIRS vs No AIRS, Dec 05	+0.2	+0.8
AIRSWF vs No AIRS, Dec 05	+0.3	+0.6
AIRS vs No AIRS (PS9), Jul 04	-0.2	+0.2
AIRSWF vs AIRS, April 05	+0.1	+0.5 *

* some question marks in the SH, although mostly for long forecast periods and it was only a 3 week trial.

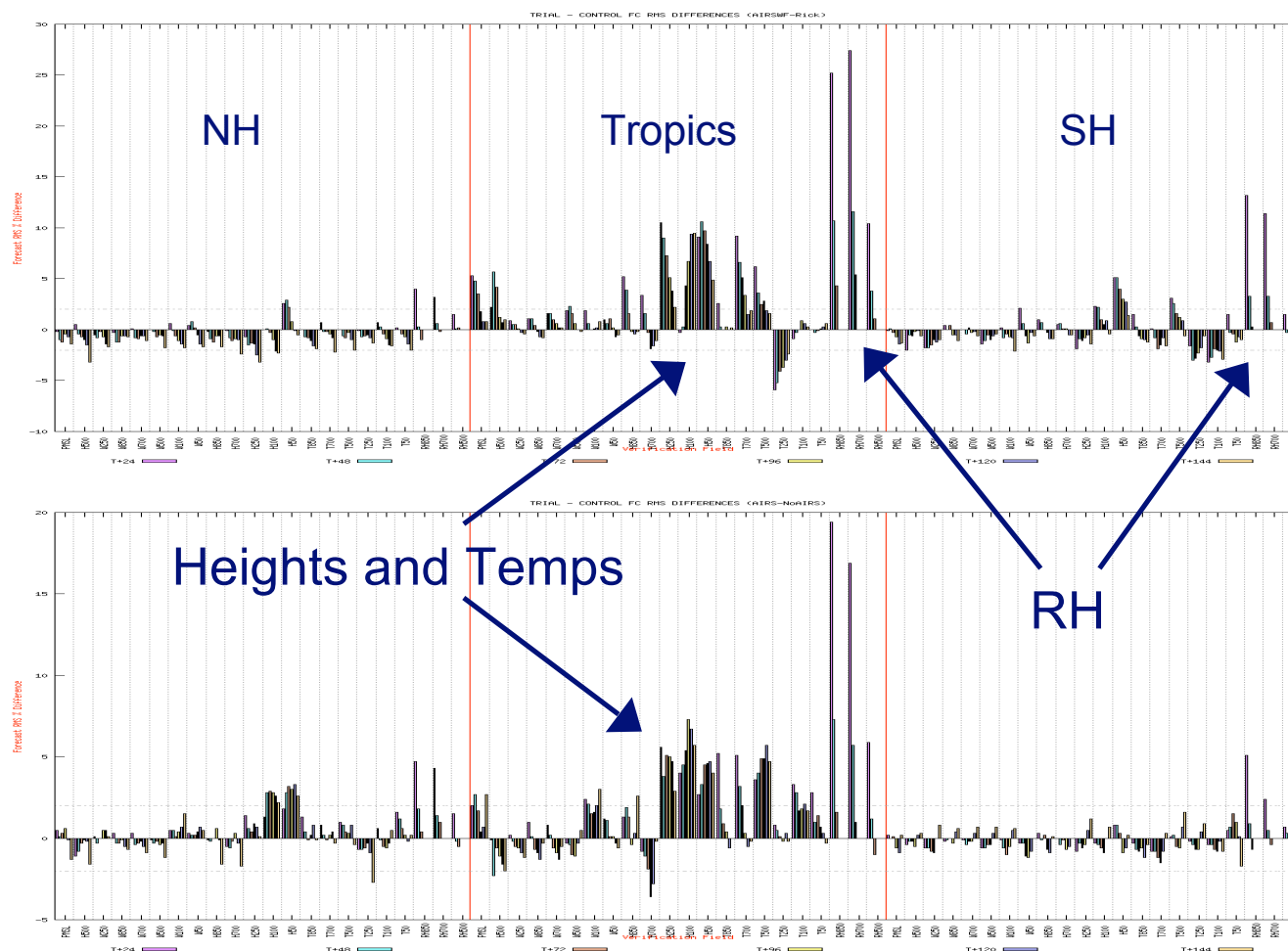
7) Verification against analysis



AIRSWF
Dec 05
(PS10)

Percentage
difference
between trial
and control
RMS
forecast error

AIRS
Jul 04
(PS9)

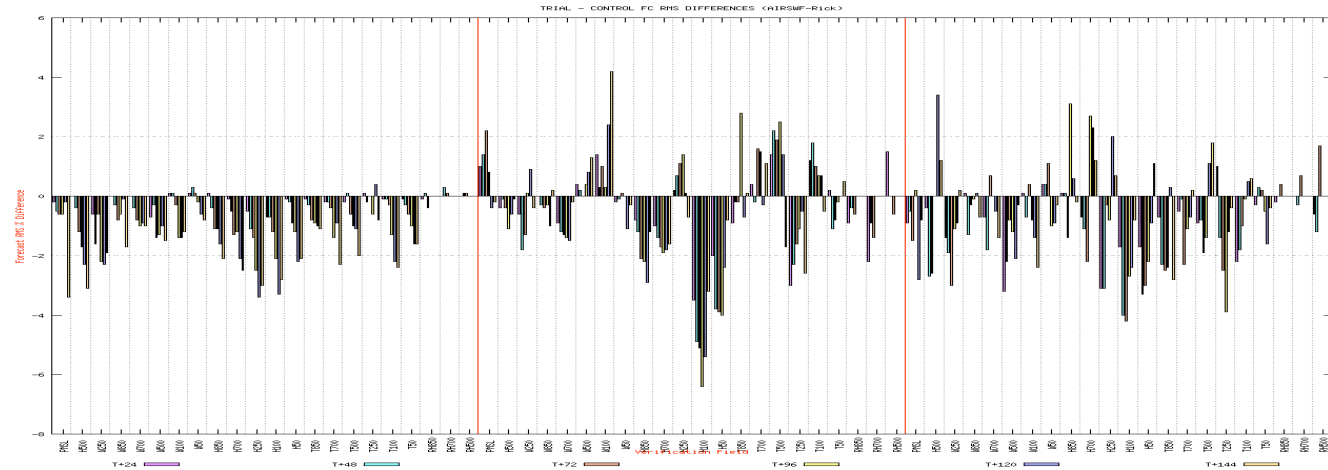


Forecast Field

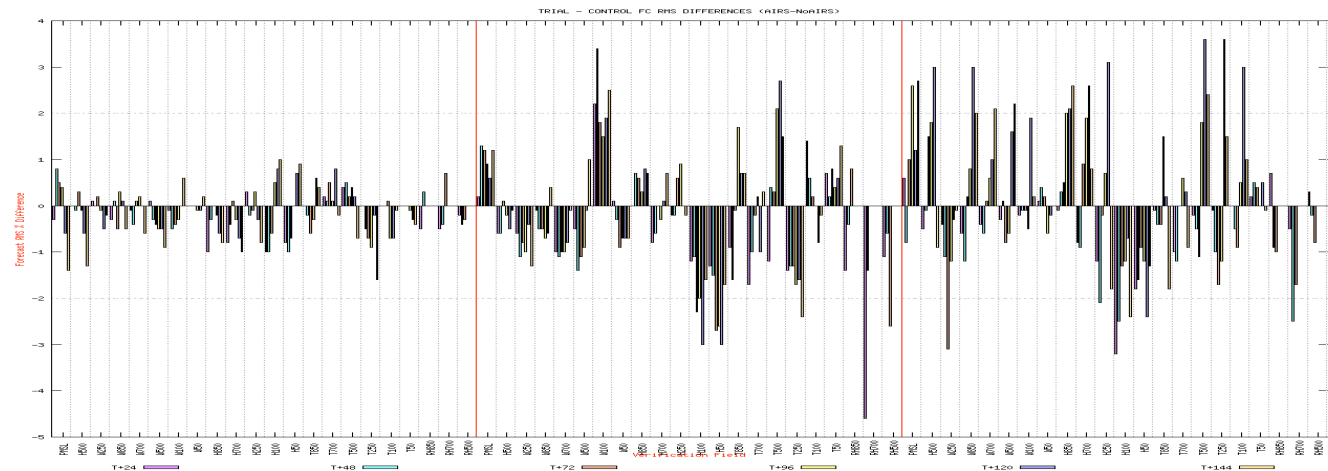
8) Verification against observations



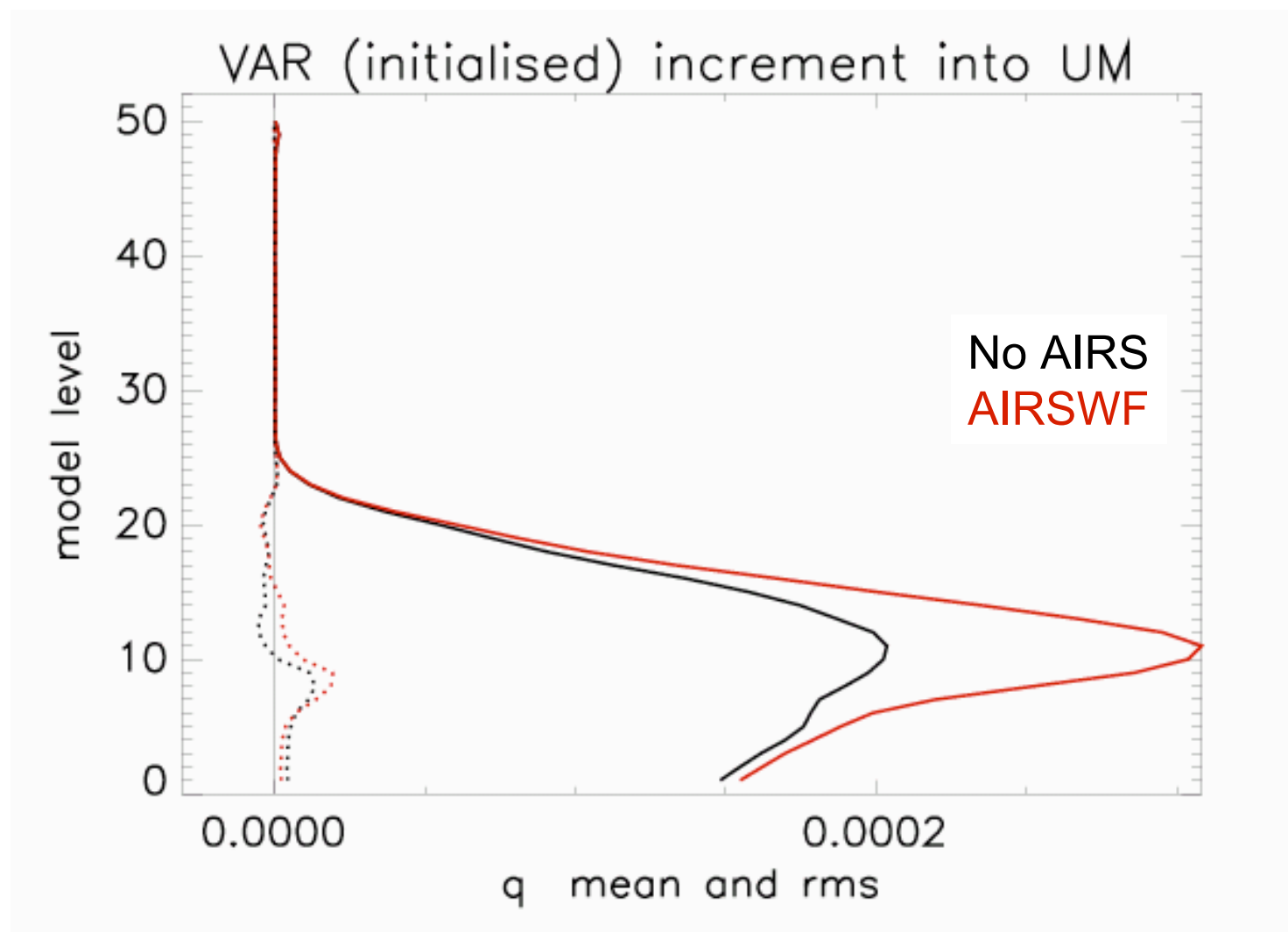
AIRSWF
Dec 05
(PS10)



AIRS
Jul 04
(PS9)



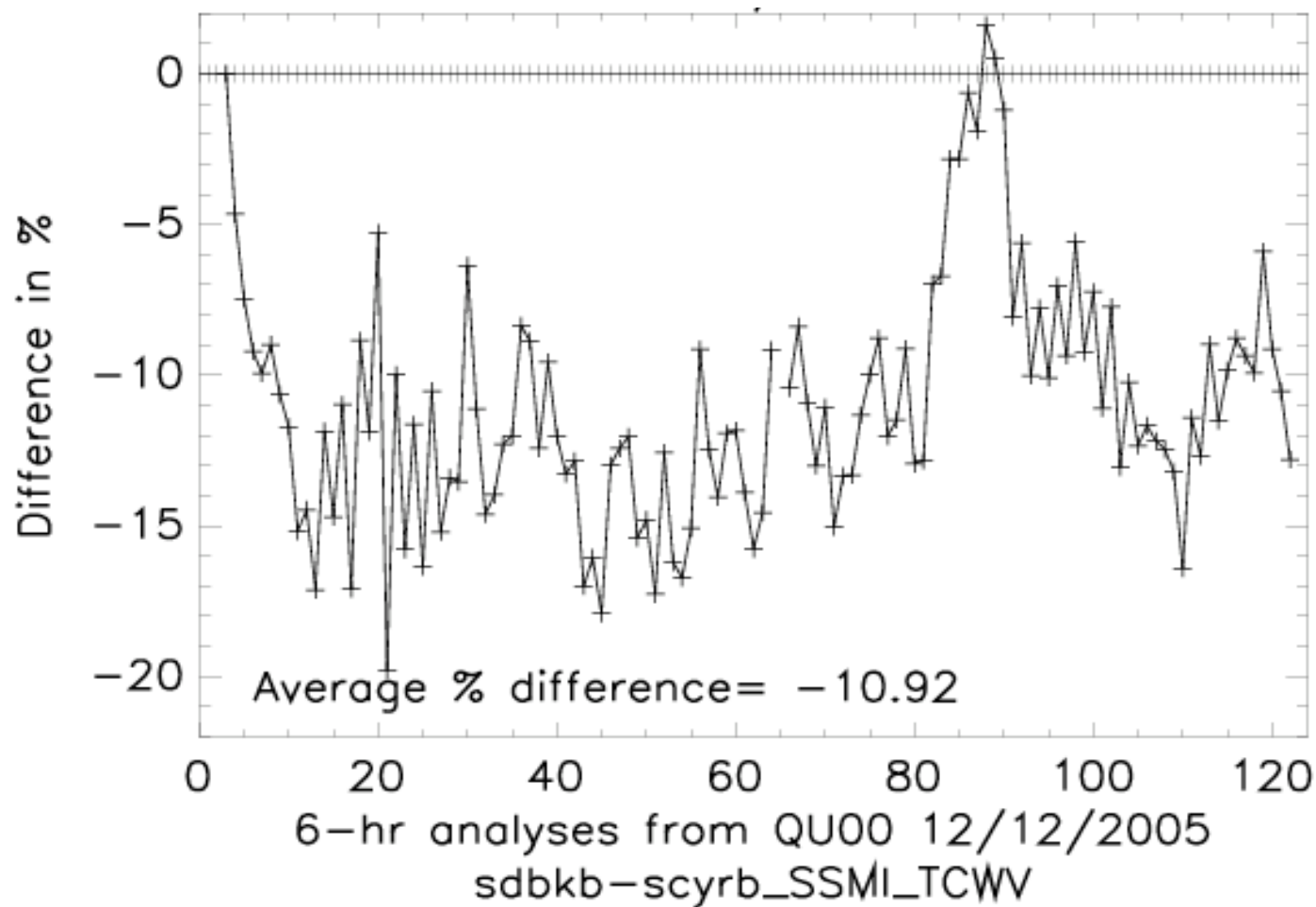
9) q increments



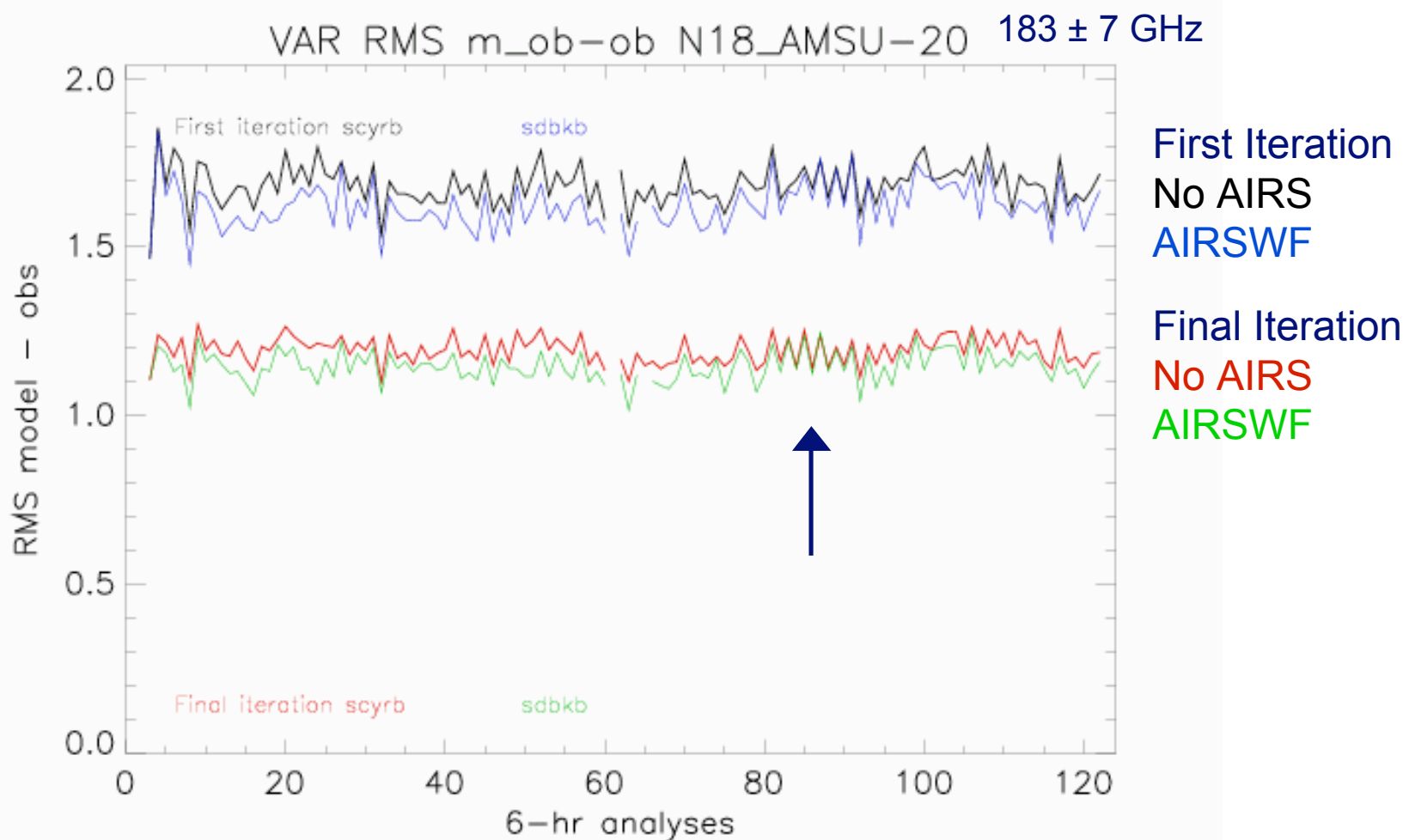
10) RMS SSMI TCWV



Percentage difference (No AIRS - AIRSWF)
of RMS Retrieved-Background SSMI TCWV



11) AMSU-B Channels



12) Re-cap



- Recent AIRS tests are in line with previous tests, although the impact is variable.
- Assimilating AIRS leads to significant humidity changes.
- All AIRS trials show improved fits to SSMI TCWV (not assimilated) and all AMSU-B channels.
- An improvement to RH is not confirmed by sondes, where no particular effect is apparent. (location?)
- We have not seen a big improvement in going from AIRS to AIRSWF.

13) Current plans



- Continue to investigate variable impact / Southern Hemisphere performance of AIRS.
- Experiment with fitting total column ozone.
- Try using more channels and review observation errors.



Questions